Washington Park
# ARBORETUM BULLETIN
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***Parrotiopsis jacquemontiana***
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# Concerning This Issue . . .

As your new editor, I came into a fortunate situation that says many good things about the Arboretum Foundation: Five of my predecessors are still part of the organization, including Brian Mulligan, Jan Pirzio-Biroli (both on the editorial board), Susan Libonati-Barnes, Palma Hoppel, and Nancy Pascoe.

*The Bulletin* also has an excellent editorial board with names that you will recognize. You'll be hearing from the board members through articles and changes in the future.

I'd like to tell you about myself and how I hope that *The Bulletin* will serve you.

I've edited a gardening magazine for Northwest environmentalists, and a journal about whales, porpoises, and dolphins. In addition to the *Washington Park Arboretum Bulletin* I currently edit *The Northwest Environmental Journal*, published by the University of Washington's Institute for Environmental Studies.

This issue is quite diverse. Director Emeritus Brian Mulligan writes about why some botanical names change in the collection and which ones to note. Clem Hamilton and Sarah Hayden Reichard of the Center for Urban Horticulture visited Chile and write about their plant discoveries in "Plants of Winter-Rain Regions, Part IV."

You will read about a difficult institutional space that has been graced with special landscaping. You also will learn about a witchhazel-like shrub with dogwood-like blooms, that is infrequently used, but suitable for Northwest landscapes. The coordinator of the Saplings Program for intermediate grade-schoolers writes about that success, and a garden designer describes the basics of planting a jungle garden that uses Northwest plants.

Coming up are a rhododendron issue and a historic issue. I look forward to meeting many of you in lectures, walks, and meetings and hope that you will send me your ideas for future issues.

Jan Silver, Editor
*The Washington Park Arboretum Bulletin*

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**Cover**: *Parrotiopsis jacquemontiana*, from Curtis's Botanical Magazine, *7501, published in 1896*.

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*Volunteer Nan Ballard teaches a class in seed propagation to saplings. Photo by Jean Haigh.*

# The Saplings Program

Jean Haigh

*The Arboretum's Saplings Program is under way for the second year. Coordinator Jean Haigh looks at its effectiveness and potential for teaching intermediate elementary school children.*

Dear Gayle and Robin,

Thank you for teaching me about plan uses. Like the bark of the willow could make a pain go away.

Sincerely,
Leah Kitz

Dear Mrs. Taft,

Thank you for your great tour. I learned many things like you can tell a cedar by its smooth stringy bark.

Sincerely,
Joshua Benoliel

Dear Volunteers

thank you for teaching us about nature. You know at first I thought it will be stupid to go on this field trip. But at the end it was fun.

Your friend
Kendall Butler.

The Saplings Program is in full swing for the 1988/1989 school year. In the fall program, we had five half-day sessions in which 30 classrooms of fourth and fifth graders from Seattle schools came to learn about the outdoors. Six classes came at a time to take an hour-long trail walk that included botany and ethnobotany (how the Indians used native plants). Each class also had a choice of two of three available half-hour classes in plant uses, nature games, and botany. About half the spaces for our spring 1989 program are filled.

Saplings started in the summer of 1987 to meet a long-recognized need to involve school children more closely with the Washington Park Arboretum. At that time, Virginia Morell, who is an Arboretum guide and the education chairperson for the Arboretum Foundation Unit Council, met with several other guides who were interested in developing such a project.

Since I am a retired teacher with experience in organizing outdoor education programs, I was asked to coordinate the program. All of the work was done by volunteers, but these included many people well-trained in fields of horticulture, botany, or education. Many had been Arboretum guides, but some were volunteers in the seed exchange, greenhouse, and the Center for Urban Horticulture's hortorium. New volunteers came forth when they heard about the program.

A three-day trial balloon was set for October 1987. Notice was published in the weekly newsletter sent to Seattle public school teachers. Response was so overwhelming that the October programs were filled within hours of publication and a long list was started for the spring of 1988. Two days were devoted entirely to fifth graders, eight classes per time. The third day consisted of one entire elementary school—457 children in 16 classes, from kindergarten through sixth grade. This was too many!

During the school year

1987-88, participants included 2,120 children in 72 classes from 24 schools. Volunteers donated 1,040 hours on the scene, which does not include the many hours some of them put into preparation.

The first year we decided to try a format with eight teaching stations designed to last most of the school day. There were four forty-five minute classes, and the children brought sack lunches. Under the tutelage of the guides and other Arboretum volunteers, the children studied native plants—botanically and for their ancient and modern uses. The eight classes included plant botany, tree botany, beekeeping, ethnobotany, use of plants, aquatic life, composting, and the native plant trail. During one session, we had a class on birds. At the end of the day, we gave teachers packets of follow-up material and an Arboretum poster. We gave the children Douglas-fir seedlings donated by the Simpson and Weyerhaeuser timber companies. One child later wrote to thank Mr. Douglas for his tree.

Saplings staff and teachers in participating schools evaluated the program at the end of the season. The results showed us that we were spread too thin. Although the diversity was interesting, it made classroom follow-up too hard.

In the spring of 1988, we offered three intermediate programs (to fourth and fifth graders), and five primary programs. The intermediate program included two one-hour walks; one emphasized botany and the other concentrated on ethnobotany. Each child also had 30-minute classes in both seed propagation and plant use. Again, we gave the teachers follow-up packets, and the children took planted seeds back to the classroom.

Second and third graders in the primary program had a one-hour walk, two 30-minute classes, and a break for juice and cookies. They finished the program at noon. Usually, they brought sack lunches and ate under the trees when their work was finished. Their program was scaled down to fit their maturity level.

We evaluated the program at the end of the spring season and concluded that half-day, instead of full-day, programs were best for everybody—the children and the volunteers. We also felt that intermediate children were better able to absorb the material offered by the Saplings staff because it meshed well with their science curriculum. That is why we now plan six intermediate classes for each half-day session.

We want to be flexible, however. Saplings is intended to be an open-ended nature study program that will encourage children to be observant and open their eyes to the world around them. We will continue to change what we do and how we do it, according to the season, the needs of the children, and the expertise and creativity of the Saplings staff.

---

Jean Haigh is a retired school teacher and Arboretum volunteer.

Dear Mrs. Haigh,

I really enjoyed my trip to see the Arboretum. I could really see all the time and effort you put in this pretty place. The Rodeadendrin brought glee to my eyes. The skunk cabbage really bought it's color out. And the tree that grew wrong was funny.

From,
Brandie Flood

Dear Arboretum Staff,

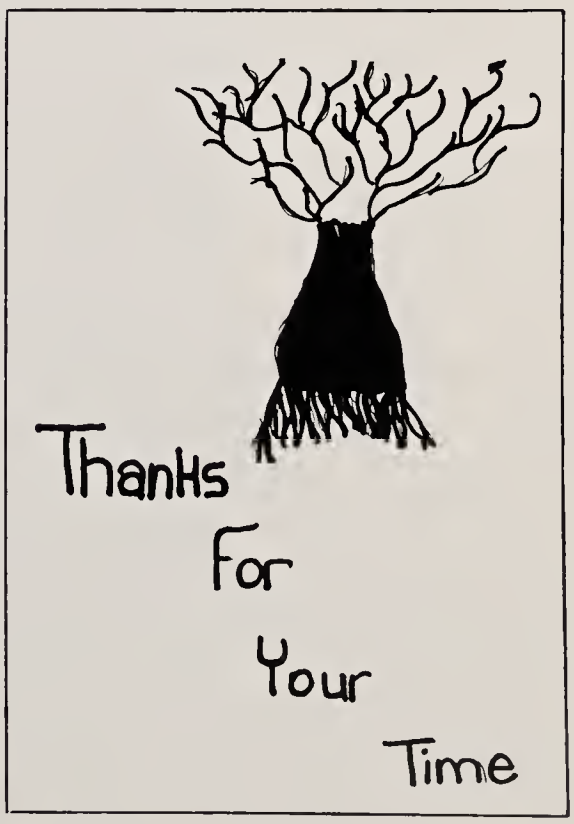
Thankyou but I was not there but I did not whant to go because I do not like the arboretum and I wood not go iny wea because I got my stichis tockon out.

Anonymous

Dear Arboretom Staff,

Thank you for inviting us to the arboretom. The thing I liked the most was the Douglas fur tree because I lived in Douglas Alaska.

from
Solan Jensen



# *Parrotiopsis jacquemontiana*

Arthur R. Kruckeberg

*Illustration by Sally Dickman*

*Parrotiopsis is a dogwood-like "witch hazel," little known to Northwest gardeners, but highly recommended.*

Most temperate members of the witch hazel family (Hamamelidaceae) are of ornamental value, some supremely so. *Parrotiopsis jacquemontiana* (Decne.) Rehd., a deciduous arborescent shrub or small tree, is most ornamental, but rarely grown in the Northwest.

Its most outstanding attributes are its habit, foliage, and unusual "flowers" (actually inflorescences). This multi-stemmed hazel-like tree grows up to 20-feet high, and is much like *Hamamelis mollis* in habit. Its leaves, reminiscent of the winter hazels (*Corylopsis* spp.), are strongly ribbed, oval in outline, usually less than three-inches long, and finely coated with stellate (star-shaped) hairs; their soft green color turns to a fine golden yellow and then to scarlet in the fall.

What appear to be small dogwood "flowers" are inflorescences with showy whitish bracts, similar to some *Cornus* species (e.g., any bracteate dogwoods such as *C. florida*, *C. kousa*, and *C. nuttallii*). These surround numerous small flowers, each with many prominent yellow stamens. The florets are perfect, but lack petals.

The one specimen in our garden, when in full bloom in mid-April, is liberally covered with these showy bracteate flower clusters—a dogwood in disguise! It regularly sets seed for us but these seem not to be viable. Propagation by cuttings or layering is recommended by Bean's *Trees and Shrubs Hardy in British Isles*.

*Parrotiopsis* contains only the species *P. jacquemontiana*. It is native to the outer Himalayas where it is common from 2,800 to 8,500 feet, between the sources of the Ravi and Indus rivers. It was discovered northwest of Delhi in the western Himalayas in Kashmir in 1836 by Dr. Hugh Falconer, of the Botanic Garden at Sahranpur. Joseph Dalton Hooker, the British botanist who was a close friend of Charles Darwin, felt it was most closely allied to *Fothergilla*, a North American genus. For more information see Curtis's *Botanical Magazine* 7501, volume 122, published in 1896 (available at the University of Washington Special Collections and Preservation Division).

In India and Pakistan, the tree's heavy, close-grained wood was used for walking-sticks, tent pegs, and native bowls; its flexuous twigs are twisted into thick ropes, up to 300-feet long, for use in bridges.

In the Washington Park Arboretum, *Parrotiopsis* plants can be seen in the witch hazel section near the Broadmoor fence on the east side of Arboretum Drive. Some were raised from seeds collected by British botanist Oleg Polunin in Kashmir in 1956.

Although it is rarely grown here, this fine woody plant is perfectly hardy. *Parrotiopsis* should be purchased and planted from October through April. I highly recommend it for Northwest gardens.

*Parrotiopsis* is available at the MsK Nursery.

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Arthur R. Kruckeberg has been a professor of botany at the University of Washington since 1950. He helped found the Washington Native Plant Society and is a consultant in environmental impacts, plants, and vegetation. He and his wife Maureen's four acres north of Seattle specialize in unusual shrubs and rock garden plants. Maureen runs the MsK Nursery at their home.

# Backyard Jungles

Jan Kowalczewski Whitner
Photos by Bruce Eckley

*Gardeners in the maritime Northwest can create their own jungle look—a practical design choice that uses plants that flourish in Zone 8 on the USDA's hardiness map.*

On first seeing the tropical landscape of equatorial Africa, a late-Victorian explorer, Mary Kingsley, wrote: ''The jungle is beyond all my expectations of tropical luxuriance and beauty. It is as full of life and beauty and passion as any symphony written: it is a veritable Cleopatra.''

Sometimes the hot and opulent regions of the earth exert a fascination on those of us who started life in more temperate zones. Perhaps this explains why gardeners from the maritime Northwest can feel much the same enthusiasm as Kingsley for the lush, the bold, and the exotic—qualities that are the essence of the jungle garden. And this fascination with the tropical may lead Northwest gardeners to try to create luxuriant landscapes in their own backyards.

Our climate and soils can support plants used in a wide variety of garden styles, although our land-

*Bamboo, hostas, and ferns at the Woodland Park Zoo give a jungle look using hardy Northwest plantings.*

scape designs tend to follow traditional types such as the conifer-rhododendron garden, the herbaceous border garden, and the Japanese garden. I advocate the wider use of a less common style, the jungle garden, because it is aesthetically pleasing, and is a practical design choice for the maritime Northwest.

The Woodland Park Zoo contains examples of tropical-looking landscapes that use plants hardy to the Northwest. Paths near the Primate House, the gorilla exhibit, and the savannah feature arching canopies of *Catalpa bignonioides* and *Albizia julibrissin* (silk tree), and secondary tiers of *Fatsia japonica*, *Choisya ternata* (Mexican orange), various bamboos, and *Trachycarpus fortunei* (windmill palm). Groundcovers include hostas, ferns, *Bergenia*, and *Crocosmia*, among others. A stroll through these areas will show you how trees, shrubs, and undercover are combined to form a satisfying jungle composition. For a brief description of a ''tropical garden'' in North London, see *Little English Backyards* (Roddy Llewellyn, Salem House, 1985, pages 18-21).

The term *jungle garden* is used here rather loosely because the design suggestions outlined below achieve a *stylized* jungle look which bears an approximate resemblance to the true tropical jungle. For instance, the true jungle is rather open and uncluttered, with only its edges overgrown by tangled thickets of plants; the jungle floor is usually quite bare except for litter. But for the purposes of creating a pleasing design that works well in a garden setting, I suggest that you use:

- ☐ lush, dense, informal patterns of planting
- ☐ plants with bold architectural forms
- ☐ brilliant shots of flower color against deep green backgrounds
- ☐ vines and epiphytes
- ☐ evergreens with entire (non-toothed) leaf margins
- ☐ water features and water-loving plants
- ☐ designs that emphasize the qualities of enclosure and mystery

This style may be termed *tropical looking* because all of the plants discussed below, with a few noted exceptions, are hardy to Zone 8 on the U.S. Department of Agriculture plant hardiness map (areas in which the average minimum temperature is 10-20° F.). In other words, this garden style does not require the use of true tropical plants which may be difficult to acquire and impossible to maintain in our area. Instead, a selected group of hardy plants, most of them familiar to Northwest gardeners from other garden styles, are combined to achieve a jungle or tropical look. Grouping together such commonplace plants as magnolias, silk trees, *Pieris*, fatsias, hostas, and daylilies brings out and reinforces each plant's tropical quality, which may not be as evident in its more usual garden settings.

## Jungle Gardens are Practical

There are several reasons why jungle gardens are feasible for the Northwest. All of the plants listed at the end of this article thrive in normal Northwest cultural conditions (although a cold, clay soil should be amended to provide reasonable drainage), and are available in local nurseries. Many of them may be designated low-maintenance plants because they are disease-resistant and require little pruning, staking, or dividing. And the informal style characteristic of the jungle look is easy to maintain.

In addition, many of these plants are evergreen and provide the year-round ''bones'' needed for strong garden design. This quality is especially important for our small urban gardens, since thick plantings of evergreens ensure privacy and enclosure in winter as well as summer. Evergreen plants also guarantee a continuity of interest throughout the seasons. For example, thick plantings of *Magnolia grandiflora*, *Aucuba*, *Choisya ternata*, bamboo, and evergreen ferns provide a glistening backdrop to Northwest winter rains and then serve as effective foils to the brilliant flowers of spring and summer.

## Planning a Tropical Garden

A backyard jungle best achieves a feeling of mystery and enclosure through a design plan that features patterns of densely planted thickets surrounding open glades or clearings. The clearings can be of varying sizes and shapes, and their function may be to catch specimen plants in shafts of sunlight, or to feature pools, rocks, or other natural ornaments consistent with the tropical look. Paths floored in soft, informal materials, such as wood shavings, should wind between the thickets and lead into and away from the clearings. The edges of paths, thickets, and clearings will look best if they are informal and overgrown. Low, spreading

Illustration by Caryn Schutzler

groundcovers such as *Ajuga*, wild ginger, and false lily-of-the-valley can spill over the edges of the boundaries to soften them.

## Tiers in the Jungle

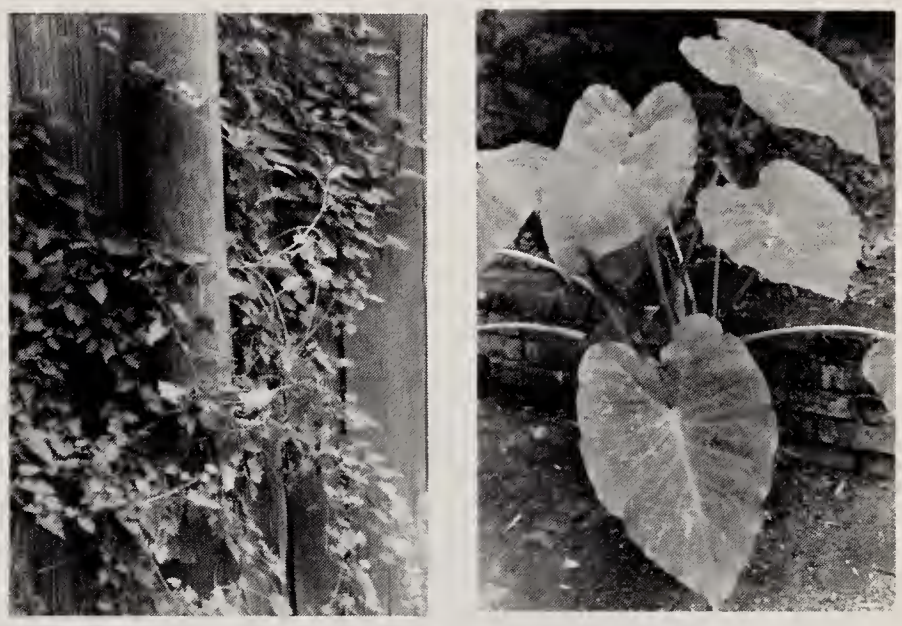
Natural tropical forests have canopies which arch high over the forest floor, providing a sense of enclosed space and creating a dappled shade to play over lower tiers of plants. The backyard jungle also needs several tiers of trees and shrubs.

**The highest canopy** is composed of taller, fine-leaved deciduous trees, such as *Ailanthus altissima* (tree of heaven), *Albizia julibrissin* (silk tree), and *Gleditsia triacanthos* (honey locust). They stand well above the heavily-planted thickets and cast light shadows over the paths. In general, the fine-leafed plants work best in the high canopy and in the background of the jungle garden—they provide a soft, light-refracting backdrop to the bold-leafed plants in the forefront.

**A second tier or canopy** can be composed of smaller trees, such as coppiced *Catalpa bignonioides* or *Paulownia tomentosa* (empress tree), mixed in with shrubs such as *Aucuba japonica*, *Fatsia japonica*, and *Pieris*. This second tier can be informally graded in the planting areas surrounding the open glades, or in areas near the paths. The rounded contours of these shrubs should be contrasted with the more upright forms of bamboo, *Phormium*, and *Yucca*, which can be used as accents.

**Groundcovers and clumps of flowers** compose the lowest tier in the stylized jungle garden. They border the paths and also push into the open glades from the surrounding thickets. When adding flowers to a jungle design, it is useful to think of them as vivid accents against a lustrous green background. Small clumps of coral, hot pink, yellow and scarlet daylilies scattered throughout the landscape will achieve such an effect. Or, for a more extravagant look, a stately phalanx of lilies can entirely fill a small glade. Whichever flower planting scheme you choose, it may be wise not to create mixed beds of flowers in a jungle garden. Such a planned effect might jar with the unstudied and unplanned effect which has been developed in the rest of the design.

A number of the flowering perennials on the plant list have spear-like foliage that proves a handsome contrast to groundcovers with bold leaves. For example, the miniature cockscomb flowers and spiky foliage of *Crocosmia* arch over the thick and blunted leaves of *Bergenia* to great effect. Or the



Polygonum aubertii *(left) vine will have small, creamy white flowers in August.* Colocasia esculenta, *in a pot, provides dramatic overgrown leaf (overwinter indoors).*

strappy leaves and elegant heads of *Allium giganteum* can be underplanted with lily-of-the-valley to provide a low, clumpy counterpoint to the vertical push of the *Allium*.

Your tropical garden is worth designing and planting if you can have fun personalizing it through unorthodox but effective plant combinations that achieve the jungle look: One example is giant purple delphiniums floating against a stand of glossy *Sasa palmata*. Or try mixing up zucchini and eggplants in a sunny spot in a jungle glade. If you love a plant, there is always a way to add it to your jungle garden, whatever its usual design associations may be.

True tropical landscapes are usually characterized by lianas, or woody vines. Vines familiar in the Northwest can act as the lianas of our backyard jungles. Vines provide mystery, color, fragrance, and depth to tropical-looking gardens. Plant the following and others with utmost abandon to achieve the overgrown affect: from spring's shimmering *Wisteria* and *Laburnum* (which actually is a small tree) to the immoderately exotic *Passiflora caerulea* (passion vine) of midsummer, and into August's *Polygonum aubertii* (silver lace vine) with its teeming leaves and sweet creamy flowers.

Epiphytes, also characteristic of true tropical landscapes, can be replicated in the Northwest jungle garden by *Polypodium glycyrrhiza*, a native fern that clings to the moss growing on tree trunks.

## Tropical Zones

Even modestly-sized gardens can have several distinct zones within their boundaries. The clearings or glades in a jungle garden can feature savannahs, pools, and swamps. Each area can be miniature in your garden, its essential qualities evoked by a characteristic topographical feature or several plants that provide atmosphere. In designing a garden with such distinct zones, it is necessary to pay particular attention to the placement of appropriate buffer plants between them.

A savannah can be suggested in a dry, sunny glade in your garden by using *Rhus typhina* (staghorn sumac) whose slender, twisting trunks and divided leaflets have a droughty look about them when underplanted with sedges, such as *Carex buchananii* (leatherleaf sedge), or grasses, such as *Alopecurus pratensis* (meadow foxtail). The savannah area can be mere steps away from a thicket of glossy evergreens and vines, with a path wandering through a buffer zone of shrubs such as *Cotinus coggygria* (smoke tree) and the saplings of *Aralia elata* (Japanese angelica tree) that will soften the transition between dense jungle and spare drylands.

Similarly, a low and boggy dip in the garden can become the site for a pool brimming with water hyacinth, duckweed, and hardy water lilies, its edges fringed with *Rodgersia* and ferns. If the installation and maintenance of a pool is inconvenient, float water lilies or water hyacinth in a ceramic container. At the University of Washington's Center for Urban Horticulture, a meandering concrete sidewalk in the entryway was configured to suggest a stream. Waterside plants also can be planted in boggy soil along with rushes and moisture-loving grasses to establish a swampy zone. In this situation, the presence of water is suggested by the lush character of the plants and an informal planting scheme.

Tropical jungles always have entranced visitors by surrounding them with a world of bloom and scent and beauty. You can create such luxuriant refuges in Northwest backyards by using familiar plants in imaginative combinations. These "Cleopatra gardens" may prove an attractive variation to the range of design choices available to the Northwest gardener.

---

Jan Kowalczewski Whitner is a garden designer who lives in Seattle.

## Plant List for a Jungle Look

The following plants are hardy to Zone 8 and easily obtainable. For further information about palms, see Timothy Hohn's article, "Palms for the Pacific Northwest," in volume 51, number 2, of the *Arboretum Bulletin*.

## Plants for Your Tropical Garden

Drought tolerant plants are indicated with an asterisk (*).

**Trees**
*Ailanthus altissima**
*Albizia julibrissin**
*Aralia elata**
*Catalpa bignonioides**
*Ficus carica**
*Gleditsia triacanthos**
*Laburnum anagyroides**
*Magnolia grandiflora*
*Paulownia tomentosa*
*Rhus typhina**
*Robinia pseudoacacia*

**Shrubs**
*Aucuba japonica* (needs shade)
*Camellia sasanqua**
*Choisya ternata**
*Cotinus coggygria**
*Fatsia japonica*
*Laurus nobilis**
*Pieris* 'Forest Flame' (needs shade)
*Viburnum davidii**
*Yucca filamentosa**

**Bamboo**
*Arundinaria disticha*
*Phyllostachys aureosulcata*
*Phyllostachys nigra*
*Sasa palmata*
*Sasa pygmaea*

**Perennials and Bulbs**
*Acanthus mollis**
*Agapanthus**
*Ajuga*
*Allium*
*Aquilegia**
*Asarum* (needs shade)
*Bergenia*
*Canna*
*Colocasia esculenta* (taro) (overwinter indoors)
*Convallaria majalis*
*Cortaderia**
*Crocosmia**
*Eichhornia crassipes* (overwinter indoors)
*Fritillaria**
*Hemerocallis**
*Hosta*
*Kniphofia**
*Lilium*
*Phormium*
*Polygonatum multiflorum*
*Rheum palmatum* (rhubarb)
*Sanguinaria canadensis*

**Vines**
*Actinidia chinensis*
*Akebia quinata**
*Campsis radicans**
*Clematis* spp. and hybrids
*Fatshedera* x *lizei*
*Hydrangea petiolaris* (needs shade)
*Lonicera* spp.*
*Passiflora caerulea**
*Polygonum aubertii**
*Wisteria* spp.*

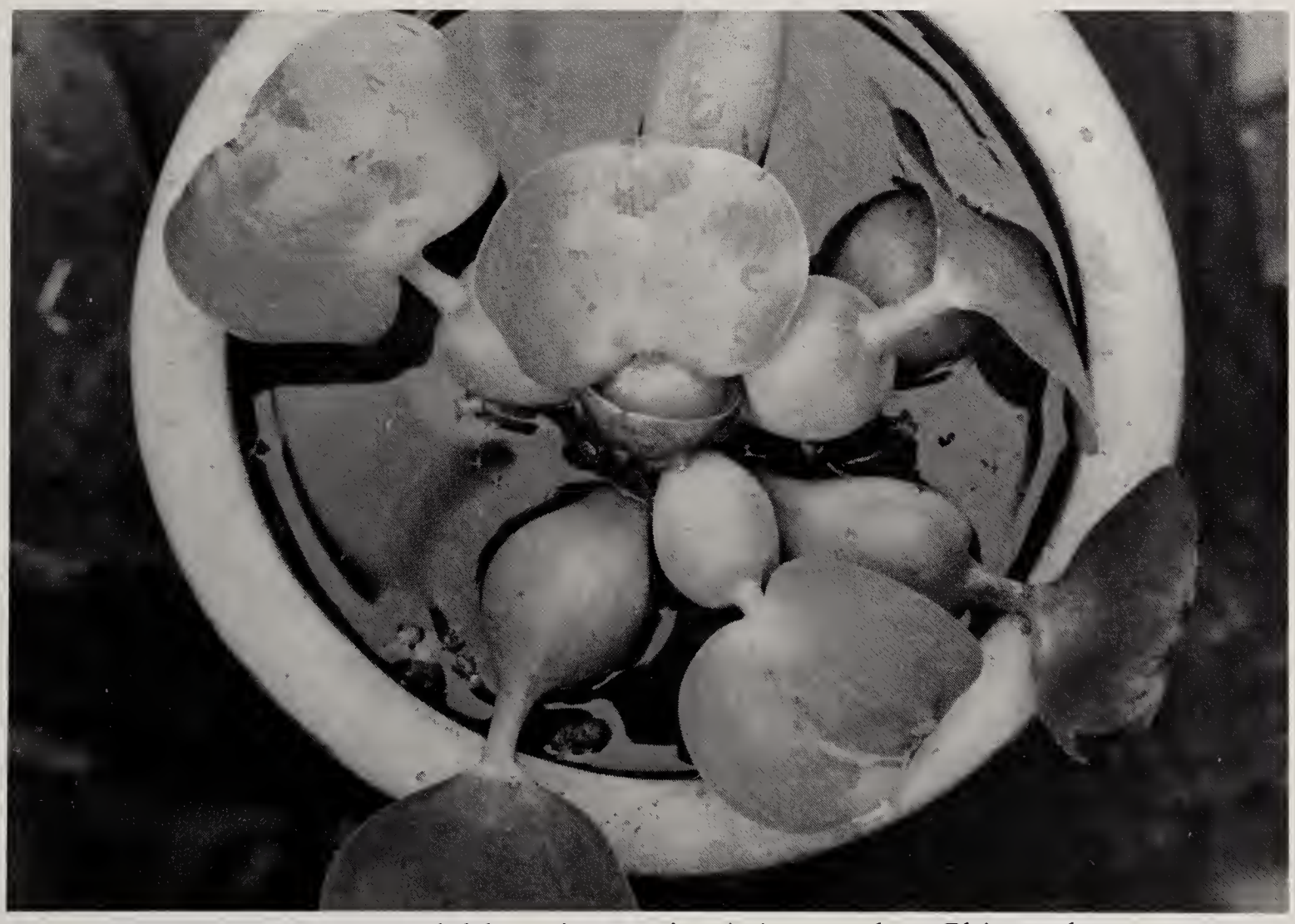
**Bog Plants**
*Equisetum hyemale*
*Gunnera*
*Ligularia*
*Osmunda regalis*
*Rodgersia*
*Zantedeschia*

**Ferns**
*Polypodium glycyrrhiza* (and many others)

**Palms**
*Chamaerops humilis*
*Trachycarpus fortunei*

**Grasses**
*Alopecurus pratensis**
*Arundo donax*
*Pennisetum**

**Sedges**
*Carex buchananii*



*Float water hyacinth* (Eichhornia crassipes) *in a pool or Chinese dragon pot to provide oxygenation and give the illusion of a water feature in a small space (bring indoors after October).*

# Drought in the Northwest

George Pinyuh

*Few people think of Seattle, Tacoma, and other areas of the Northwest as being a drought area. But for gardeners who use plants from the rainy areas they think are companionable to Seattle, there are some caveats and some tips.*

During the summer of 1988, our western Washington water supply turned out far more certain than it appeared it might be during the spring. However, it continues to be important to practice every reasonable horticultural procedure designed not only to save water, but to maximize the effect of what water is used in lawns and gardens. Even normal Northwest summers with their paucity of rainfall should always demand close attention to watering and conservation techniques.

For those who don't believe in the droughtiness of ordinary western Washington summers, a comparison of Seattle-Tacoma summer rainfall with a few other areas of the world might prove interesting. These areas, by the way, are the original sources of a large majority of the ornamental plants that we use. Obviously, they evolved in locales where summer rainfall is the norm and, in most cases, the quantity of rain is extraordinary. The rhododendrons, azaleas, magnolias, dogwoods, maples, and turf grasses that come from such areas will either require a considerable amount of irrigation or will need to be managed appropriately with water conserving techniques in mind.

The average rainfall for the four months of May through August in the Seattle-Tacoma area is about 5.1 inches. For the same period, New York City's precipitation is 20.8 inches, about four times greater. During this period in the Himalayas and western China, an astonishing 42.8 inches comes down. Japan, another source of many of our ornamentals, goes into the record books with 23.6 inches of precipitation during the summer months. In other words, when plants' demand for water is the greatest in our area, even in a normal summer they can count on precious little falling from the sky.

Surely, we shall experience more summers where water for outdoor use will be restricted. Given the fact that no summer really provides adequate rainfall hereabouts, all we need is another poor snowpack or early meltdown and we're right back in the same predicament we were in during the summer of 1987.

The influx of population into the I-5 corridor over the next ten years or so will put even more pressure on our available water resources. The cost of water is almost sure to rise as all these new folks also become involved in planting yards and gardens.

Let's review some of the ways to deal with plants, keeping water conservation in mind. Good garden habits learned now could make a big difference down the line.

One of the ways so much water is lost to plants is by evaporation from the soil surface. To cut down on this waste of water, good mulching practices can't be beaten. Use leaves, bark, shavings, wood chips, grass clippings, manure, compost, sawdust, or other organic materials around and under all shrubs and trees. Avoid using stuff like peat moss or sawdust alone as it often packs, dries, and sheds water when it is applied or when it does rain. Newspapers or plastic underneath organic mulches should have holes punched in them so oxygen, carbon dioxide, and water can pass through freely.

Keep weeds under control around all desirable plants. They compete heavily for available water supplies. While you're at it, make it a practice to have all turfgrass cleared from underneath shrubs and trees—especially young ones. The turf acts just like weeds by competing for nutrients and water.

Turf areas should be dethatched on a regular basis to allow for free movement of water into the grass plants' root zone. It is a total waste when water hits dry thatch and rolls off into the street.

Compacted soils ought to be managed with a proven aerification process. Remove plugs of soil 3 inches or so deep and 3-4 inches apart in all compacted turf grass areas. This should help water get down into the root zones. Don't rely on punching holes with a fork; this won't help at all.

When irrigation is carried out, it should occur

when most of the water will not be lost to evaporation. Early morning is probably the best time to water to avoid evaporative water loss; the plants may be able to make better use of it then.

Don't put water on any faster than your soil can absorb it. Sandy soils take water in quickly, but clays, because of their tight nature, will repel a great deal of it if it is put on too quickly. Clay soils don't need watering as often as sandy ones.

Avoid shallow irrigation as this may encourage shallow root systems susceptible to drought damage. Roots only grow where there's moisture, so get the water down deep into the soil profile.

Do not locate the plants that use a high amount of water, like rhododendrons, in full sun or near hot surfaces. Just to keep them alive, a great deal of water will need to be expended. Partly shady areas are best for such plants.

Irrigation systems that are tied to a clock should be bypassed, if the weather is cool and overcast. With less plant demand for water, why allow your irrigation system's clock to waste it? Soil moisture-sensing devices can be incorporated into watering systems.

The technology for microapplication of water (drip, trickle, oozers, etc.) is advancing all the time and should be considered when irrigation systems are being planned. Up to 80% of irrigation water may be saved with such systems.

Sloped turf areas are hard to keep irrigated. Ground covers that are low-water users may be more appropriate for such sites.

Deeply prepared and amended soils may help to save water in vegetable and flower gardens as well as landscaped areas. Plenty of organic matter incorporated in soils can soak up water that might otherwise be lost as it percolates through the soil profile. Organic matter can absorb many times its own weight in water, which then is held available for plant use.

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George Pinyuh is a Washington State University Extension Agent.

## More Reading

The Elisabeth C. Miller Horticultural Library has prepared an extensive reading list, "Gardening During Drought: Water Saving Strategies and Drought Tolerant Plants." Ask for it at the desk.

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# Urban Landscapes for Clear Thinking

*Photos by Mark Danford.*

Pat Danford

*The concrete campus of North Seattle Community College has become a place to find nature, learn, and reduce stress.*

North Seattle Community College is a public educational institution sitting on the edge of Interstate 5 in a growing urban environment. Built in 1970, of concrete, it looks from almost any direction like an imposing fortress.

Don't expect the beauty of a traditional college campus with tree-shaded paths amidst ornate old buildings. But once you discover the beautiful plantings on this city campus, you will no longer be overwhelmed by the battleship buildings.

Plants have helped to create an environment that students and staff need not only for aesthetics, but to reduce stress and help them think clearly. States designer Tom Berger about the landscaping: "We intended to provide a contrast to the architectural style."

Studies by environmental psychologists Rachel Kaplan and Steven Kaplan show that people want to be where there is any bit of nature nearby—especially trees, foliage, and water. Just a view contributes to one's sense of well-being. Repeated studies show consistency in what people prefer. Steven Kaplan points out that in the long run, we prefer what we need to function effectively.

The urban environment increases stressful stimuli in our lives; we are bombarded with noise and rudeness. Studies by the experimental social psychologists David Glass and Jerome Singer in *Urban Stress* (published in 1972), show our problem-solving and social cooperative abilities deteriorate with bureaucratic assault or screeching traffic noise. To adapt and shield ourselves, we increasingly expend more effort until we are brain-weary.

Relaxing surroundings reduce stress, enabling us to think clearly. We perform better on physical and mental tests when the nervous system is relaxed and oxygen to the brain is increased. Kaplan wrote, "Natural settings for recovery from overload and stress make sense."

Urban vegetation provides a way in which to rest the mind with its calming shapes, colors, and forms. They work on our visual brain centers the way slow music does upon our hearing centers. The pleasurable stimulation leads to a state of relaxed, attentive awareness. Joachim Wohwill, an environmental psychologist, writes on how plants provide relief to people who are concerned with the responses of others. Around plants, we mentally merge into nature.

Says student Pablo Sepulveda: ''Everyday I look at the flowers and trees. It's amazing. There are flowers all the time—not just during the spring. During the fall, and for sure in the winter, we will have flowers. That's great! I always look at them and it makes me feel good.''

On the North Seattle Community College campus, students and staff benefit directly from the natural world as they walk from building to building. Trees create ceilings, light patterns, sculptures, and views; pools with fountains provide reflections and splashing sounds. Beds of low evergreens draw the eyes to a mix of leaf patterns—lacy, striped, ragged, or smooth—soothing places where the mind can rest.

When you step out of the library, on the second level, to take a break from intensive study, you can look down through tree tops and view the entire inner courtyard. Below, students often sit and read on square cement benches interspersed among slender trees. In autumn, the gold and pinkish leaves appear to glow within the concrete walls of nearby buildings. During the spring, the sun beams through branches, allowing a choice of benches in sun or shade.

Student Carolyn Wenzl had this comment upon emerging from the library. ''I was just noticing the tulip trees turning yellow from inside the conference room. I notice the planters every day when I come in. I like to look at the different plants that are in them. I like the sound of the water, too. Last quarter, when I took botany, I found myself zeroing in on every tree I could look at. I enjoy as many flowers and plants as they can get out here.''

Freeway Plaza is a huge roof-top plaza. After rushing through city traffic and climbing up from the parking lot, you stand in the center of its broad expanse, close to the sky, with sweeping views all around you. Although you can hear the freeway and, turning, see the blur of traffic, you are clearly separated—detached. Up there, a Sanskrit poem comes to mind: ''Dwell in a place endlessly spacious/Thus ends mind's pressures.''

Says Michael Brokaw, grounds supervisor of the campus horticultural collection: ''Up here on the deck, I'm always struck, in the fall, particularly by how the foliage at the south end of the campus echoes the colors of the flowers here. Most falls, those yellow maple leaves, poplars, and so forth have a color range similar to the kinds of plants that are planted in the containers on the roof, so there's that bridge from the roof plaza right on out into the forest at the south end of the campus that I think is attractive. Your eye is drawn from the immediate to the middle distance.''

The Kaplans found that people want this visual access to their surroundings—the ability to see ahead enough to figure out where they are going. On the several levels of North Seattle Community college campus, covered walkways hug building walls and then open onto courts or plazas. You move from view to tree to flash of color. You admire from up close or afar. Throughout the campus, there is a repetition of color, pattern and texture: cherries (*Prunus subhirtella*), Japanese black

*Fountains and pool at North Seattle Community College. Photo by Mark Danford.*

pines (*Pinus thunbergiana*), pin oaks (*Quercus palustris*), ground covers, ivy, and circular containers crowded with flowers.

People are pleased when diversity and complexity grab and hold their interest. In fall, shiny red "ivy" (not a true ivy), *Parthenocissus*, marks deep accents; in winter, its leafless vines reveal intriguing designs, which in spring fill in with changing leaf sizes and color—bright yellow-green merging into red. Small touches, such as crocuses tucked here and there, encourage the eye to dally and belie the fact that this place is an institution.

Michael Brokaw "noticed there was the beginning of a year round bloom cycle in the original design of the campus. Over the years I have worked to enhance that—to increase the number of months we do have plants in flower and increase the amount of flowering things that are present at certain times of the year, especially when school starts and when school comes to a close in the springtime. The flowering period sort of crescendos in the spring and again in the fall. Since the period from fall to spring is when the campus is most populated, that's the time when it should really perform."

As students walk to class, they can observe closely the gradual development of the dogwoods' pinkish bracts around green button-like centers into the final white bracts. A short distance away, they can move up close to the pink silk blossoms of a mimosa tree (*Albizia julibrissin* 'Rosea'), its branches spread wide.

Crossing Freeway Plaza on a winter's day, the dramatic silhouettes of the Japanese black pines and staghorn sumacs (*Rhus typhina*) catch the eye.

On this campus, the Wisteria Courtyard is a surprise to come upon. After passing a walled-in court and stairways, you come to it having taken a straight walk along a cement wall. A turn, and there you are in a wide-open grassy area with beds of bulbs and perennials, an *Iris* collection, and wisteria trained to grace a stairway wall.

Landscape Architect Tom Berger comments: "We tried to select plants that would give people a greater awareness. We wanted students to stop and say, "Gee, I've never seen that before."

Michael Brokaw is working with students and staff to refocus the master plan for the twenty-first century. By providing for human needs, this college has increased each student's likelihood of educational success.

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Pat Danford taught English at Olympic College for 18 years and now is a tutor at North Seattle Community College. Pat volunteers at the Mrs. Otis Douglas Hyde Hortorium, at the Center for Urban Horticulture, and is an Arboretum guide.

*Looking south on Freeway Plaza to a skyline of conifers, poplars, and maples. Photo by Mark Danford.*

*Wisteria (above) on the stairway leading down to the Wisteria courtyard (below, top right). The view of the central courtyard (below, center) shows over 60 sycamore maple trees* (Acer pseudoplatanus) *which project from ivy openings in the concrete. Blossoms from the dogwood trees* (Cornus nuttallii) *that grow near a railing on Freeway Plaza, are lower right.*

*Photo by Mark Danford.*

*Photo by Mark Danford.*

*Photo by Nguyen Son.*

# Some Changed Names in the Arboretum Catalog and Plant Collections

Brian O. Mulligan

*"Things are seldom what they seem,*
*Skim milk masquerades as cream."*
*So goes the song from HMS* Pinafore. *Mistaken identity is a fact of life in designating the tree species in any collection. Brian Mulligan uses examples from the Arboretum's collection to show the whys and wherefores of the confusion and what is done about it.*

Since the 1977 publication of *Woody Plants in the University of Washington Arboretum, Washington Park*, a number of corrections have been made to the nomenclature of Arboretum trees.

Confusion in identifying plants occurs for many reasons. Here, we can cover a few. Sometimes names are carefully assigned to a plant, only to find out that there is an earlier name or a more correct one. Internationally-recognized rules require that we change errors so that botanists around the world can share information about consistent generic and specific names. For this reason, writers use taxonomic nomenclature to ensure universal understanding.

Occasionally a botanist working on a particular genus discovers that certain names now in use are really synonymous with other species or varieties described earlier. An example is to be found in *Corylopsis*. In 1977, two botanists who were studying the entire genus found that two species, *C. yunnanensis* Diels (1912) and *C. willmottiae* Rehder and Wilson (1913), both were varieties of the older *C. sinensis* Hemsley (1906).

Occasionally, an earlier legitimate name for a plant prevails. *Magnolia* x *wieseneri* (1890) is the earliest name for the hybrid magnolia long known as *Magnolia* x *watsonii* (1891). Since *wieseneri* was published one year earlier, it made all the difference in accepting *wieseneri* as the correct specific name.

Quite frequently, a plant has been grown under the wrong name since it was received and eventually planted out. *Cornus poliophylla*, a large shrub from central China, was raised from seeds received from the New York Botanical Garden in 1939 and planted in the Washington Park Arboretum in 1948. In 1984 it was identified as *C. coreana*, a native of Korea!

Seeds of two species of ash from Japan were received in 1950. One was *Fraxinus pubinervis* and the other, *F. spaethiana*. Plants of both were set out in the Arboretum in 1956. *Fraxinus pubinervis* first flowered in 1985; *F. spaethiana* has not yet been seen to do so. Both have turned out to be *F. japonica*, a less ornamental species than either of the other two.

In 1985, an oak grown for many years as *Quercus frainetto* (Hungarian oak) was discovered to be the Japanese Daimio oak, *Q. dentata*, which is rather similar in foliage.

Two *Stewartia* plants were imported in October 1952 from the Hillier & Sons Nursery, Winchester, England, via the New York Botanical Garden, as *S. serrata*, a Japanese tree. They were planted in the camellia garden in the Arboretum in 1955 and 1963, respectively. However, suspicions arose later about their true identity. In 1987 and again when flowering in July 1988, careful examination showed that they were in reality examples of the Chinese tree *S. rostrata*, which was first described by Dr. S. Spongberg of the Arnold Arboretum, Boston, in 1974. Dried specimens in their herbarium had

*Magnolia x* wieseneri *in Belgian garden. Photo by B. O. Mulligan.*

Acer japonicum *acquired by the Arboretum in 1940. Photo courtesy of the Center for Urban Horticulture.*

been mixed with some of the true *S. sinensis*, another Chinese species introduced by E.H. Wilson in 1901. Evidently, some plants growing in England prior to 1950 under the name of *S. serrata* were the original source of our material, either as seeds or cuttings.

Then, in December 1957, we imported two plants of *Stewartia sinensis* directly from the same Hillier Nursery. In February 1963, both were planted in the same area as the preceding species. First flowering was noted in early July 1966. In 1987 and again in 1988 we scrutinized these plants as we had with the other pair. Their botanical characters showed that they were in reality the hybrid *S.* x *henryae*, first described in 1964 and named for Mrs. Mary Henry of Gladwyne, Pennsylvania, in whose garden it had occurred. The parents of this hybrid are *S. pseudocamellia* and *S. monadelpha*. It shows the characteristic peeling bark on the stems of the former species, but is inferior to it in flower qualities. The original source of our imported plants in England, beyond the nursery, is unknown to us. All four plants have been re-labeled with their correct names.

Although most of the mis-named plants in the Arboretum have been raised from seeds received from other arboreta or botanical gardens, a lesser number were acquired as living plants bought from nurseries.

Since the early 1980s, the nomenclature of the Arboretum's maples has been checked and some changes made.

Sometimes, the stock outgrows the grafted scion leaving us with the original species on which it was grafted. For example, a number of clones (cultivars) of Japanese maples were carefully checked in August 1983 with the authoritative book by J.D. Vertrees, *Japanese Maples* (Timber Press, Portland, Oregon, 1978). Eight out of 57 were found to be typical plants of *Acer palmatum*, no doubt because the stocks outgrew the scions.

Until recently, *Acer shirasawanum* 'Aureum' was universally known and grown as *A. japonicum* 'Aureum,' a small tree which had been grown in Europe since at least the 1880s, and probably earlier was imported from Japan. In January 1984, an article by Dr. Thomas Delendick in *Brittonia*, the New York Botanical Garden's quarterly journal, cleared up this old problem. *Acer shirasawanum* has smaller, 11-lobed leaves on longer, quite smooth stalks, in comparison with *A. japonicum*, which may have from 9-11 lobes, on hairy petioles; additionally, the petals of the flowers are white in the former and purplish-red in the latter.

A good example of *A. shirasawanum* can be found inside the Japanese Garden, near the main entrance. There are also two specimens of *A. japonicum* growing there in different locations, and an even larger one close to Arboretum Drive at Woodland Garden. *Acer japonicum* was imported from Japan in 1940. In 1958, the Arboretum received a maple from Rutgers University, New Jersey, under the name of *A. sieboldianum* var. *microphyllum*. This also was discovered to be another example of *A. shirasawanum*, in 1983.

The maple that formerly was identified as *A. palmatum* 'Argenteo-Marginatum' is 'Hikasayama,' and the one formerly known as 'Reticulatum' is 'Shigitatsu-sawa.' Our 'Corallinum' is 'Sango-kaku.' They all grow in the collection of Japanese maples in Woodland Garden near the north end of the Arboretum.

Such problems are common wherever trees are grown. At the Washington Park Arboretum, errors are corrected as often as they are discovered by staff members, volunteers, or students. For example, Arthur Lee Jacobson has contributed much to the effort to check plant nomenclature, especially of trees. In addition, staff and volunteers of the Mrs. Otis Douglas Hyde Hortorium, Center for Urban Horticulture, are collecting specimens in order to check identifications.

Changes must be confirmed by careful comparison of living material with available descriptions in books and manuals on woody plants (e.g., by Rehder, Krussmann, or Bean). The record cards and labels then are changed for future reference, noting the reasons for the change and the source of the information.

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Brian O. Mulligan is director emeritus of the Washington Park Arboretum.

# Plant Exploring in Southern Chile

Clement W. Hamilton and
Sarah Hayden Reichard

*Southcentral Chile, with key field localities labeled.*
*Map prepared by Karen Krager.*

*The region of Chile, between 32° and 42° S latitude, is one of five in the world (including the U.S. Pacific Northwest) that has a "Mediterranean" type of climate characterized by winter rainfall and summer drought.*

Imagine a land with soaring mountain ranges dotted with spectacular snow-capped volcanoes. One range hugs the coast, the other is inland, and the two frame a fertile central valley. The mountains are clothed with dense evergreen forests that are nurtured by ample winter rainfall and stressed by summer drought. Sapphire lakes are scattered about, providing relief and recreation during the long hot summers.

You may have envisioned the beautiful Pacific Northwest, with the Olympics and Cascades, Mt. Rainier and Mt. Baker. But it could just as easily describe the region of southcentral Chile where a rich fluvial valley is bordered to the west by the Cordillera Occidental and to the east by the Andes. This region is famous for its cool scenic lakes and cone-shaped volcanoes that rival Mt. Rainier.

Although the physical parallels to the Northwest are striking, the similarities in climate patterns first attracted our attention to this area as a source of new, well-adapted landscape plants. Plants that are adapted to a cool summer-drought environment should be able to thrive here in a landscape setting without additional irrigation, even in a summer as severe as 1987. The temperatures in the Lakes Region of Chile, although generally somewhat milder, also are like those of the Pacific Northwest: In Valdivia (at sea level) the winter low temperature might be 5° C, but at Antillanca (1,100 m elevation) the temperature can reach 0° C and less for several consecutive nights.

It would be expected that such a beautiful area of the world would have been thoroughly explored for plants of landscape value. Surprisingly, this is not the case. Charles Darwin, on his famous voyage of the HMS *Beagle*, passed through in 1833. In 1846, William Lobb visited the region on behalf of Veitch's Nursery in England and made initial horticultural introductions of many genera. Occasional explorers have visited since then, but many of the plants introduced have not been collected from the most appropriate microhabitat and, therefore, have been thought to be too tender for the Northwest. Those plants that have been successfully introduced include *Araucaria araucana* (the monkey-puzzle tree), *Pernettya mucronata*, *Berberis darwinii*, *Fuchsia magellanica*, *Escallonia rubra*, and some species of *Nothofagus*, including *N. antarctica* and *N. dombeyi*.

So, in January 1988, we gathered our gear and preconceptions and flew south to Chile for two months of fieldwork. We explored for landscape plants, in general, and investigated, in particular, two genera that deserve greater use in the altered landscapes of the Northwest—*Escallonia* and *Drimys*.

## Plant Exploring in Chile

There are as many technical classifications of the vegetation of southcentral Chile as there have been biogeographers working on the subject. However, a few general categories of forest stand out: Valdivian rain forest, *Nothofagus* forest, *Araucaria* forest, *Austrocedrus* forest, *Fitzroya* forest, and sub-alpine scrub forest. We will describe these below, as we encountered them on our 2,000-mile journey, much of it in a four-wheel drive vehicle, between the latitudes of 35° and 42° S (plus Tierra del Fuego; see the map).

We learned at the outset that Chile is an easy place to study, thanks to an excellent system of national parks and knowledgeable, helpful people working in government agencies and universities. Our primary bases of operation were the Universidad Austral de Chile in Valdivia, close to the majority of our best field localities, and the Universidad de Concepcion, whose botany department is the cornerstone of the Flora de Chile project just being started. We were thankful that the parks were as numerous as they were, because the land outside, including almost the entire central valley, is farmland, pasture, or *Pinus radiata* "forest." As a result, many of the native lowland species, such as *Escallonia gayana*, are threatened with extinction.

**Los Alerzales**. Our fieldwork began in a national park at 700-1,000 m elevation in the coast range, just south of Valdivia (around 40° S). Parque Nacional Los Alerzales is dominated by forests

Drimys winteri *var.* andina *at Parque Nacional Puyehue.*
*Photo by Sarah Hayden Reichard.*

of *Fitzroya cupressoides*, a conifer that reaches several meters in trunk diameter. Another conifer, *Podocarpus nubigenus*, was also common in company with species of *Nothofagus*. At higher elevations, the vegetation became more scrubby and there we first encountered *Drimys*, *Escallonia*, and the giant fearless black flies called *tabanos* that were to plague us the next two weeks. There we also saw *Philesia magellanica*, an epiphyte with pendent pink lily-like flowers; it is a smaller and hardier version of the national flower, *Lapageria rosea*, whose likeness graces postage stamps as well as bottles of mineral water. *Lapageria rosea* can be viewed at the Volunteer Park Conservatory in Seattle. Two other epiphytes that we saw throughout the region belong to the Gesneriaceae: *Asteranthera ovata* and *Mitraria coccinea*, with orange-to-red tubular flowers that attract hummingbird pollinators. Plants from this region experience summer drought and might be hardy in the Puget Sound region, but plants from cooler localities farther south stand an even better chance. That is where we were headed next.

**Puyehue**. We spent more time at Parque Nacional Puyehue (about 41° S) than at any other location. Its elevation ranges from 500 m at Aguas Calientes to 1,300 m at Andean volcanic craters above the ski lodge at Antillanca. This may be the best source area for landscape plants for the Pacific Northwest and the locality that could serve best as a model for a Chilean landscape in the Washington Park Arboretum. In addition, populations there of *Drimys* and *Escallonia*, such as *E. virgata* (see photo), yielded crucial data for our analyses.

The Valdivian rain forest, from 500 to 750 m, has the most biologically diverse vegetation, with mostly unfamiliar broad-leaved evergreens such as *Laurelia philippiana*, *Eucryphia cordifolia*, *Aextoxicon punctatum*, and *Drimys winteri*, plus conifers *Saxegothea conspicua* and *Pilgerodendron uviferum*.

Especially intriguing for potential landscape use are two species in the Cunoniaceae: *Caldcluvia paniculata* and *Weinmannia trichosperma*. *Caldcluvia* is a small tree, to 8 m high, with glossy simple leaves and axillary inflorescences of many small white flowers. *Weinmannia* has toothed, pinnately compound leaves with winged rachis and often reddish inflorescences. The understory,

especially in open areas, features the extremely common, even weedy, *Fuchsia magellanica* and members of the family Myrtaceae (such as the cultivated *Luma apiculata*), with their red trunks, small leaves, and showy white flowers. Another familiar genus is represented by the most common climber, *Hydrangea serratifolia*; once, farther north, we saw it cascading over a rocky waterfall.

At 750-1,000 m elevation, most Valdivian rain forest species drop out as *Nothofagus* gains dominance among the trees, particularly *N. dombeyi* and *N. betuloides*. Here one encounters in great numbers one of the most spectacular plants in southern Chile, *Desfontainia spinosa*, typically a 2-meter shrub with brilliant green, evergreen, holly-like leaves and large pendent tubular flowers that are orange-red along the tube and yellow-orange at the mouth; it is listed in Hillier's *Manual* and deserves consideration for broader introduction. Another common understory species familiar to avid plant growers and collectors is *Azara lanceolata*, an elegant 2-to-4 meter shrub with large round stipules at the leaf bases and striking rosy white fruit.

Above 1,000 m, *Nothofagus pumilio* assumes dominance as the canopy opens and the understory simplifies to masses of the bamboo *Chusquea macrostachya* and/or a smaller variety of *Drimys winteri*, whose evergreen leaves and magnolia-like flowers recommend its development as a landscape shrub (see photo). Other well-known genera that are more conspicuous at higher elevations are *Ribes*, *Gaultheria*, and *Pernettya*. Above tree line, low groundcover forms of *Escallonia alpina* and *Embothrium coccineum* populate the windswept craters.

**Parque Nacional Alerce Andino**. East of the lively city of Puerto Montt (where almost half of the street trees are *Embothrium coccineum*) is Parque Nacional Alerce Andino, at about 41° 30' S, in an area with less summer drought than the Pacific Northwest. Like Los Alerzales, Alerce Andino is dominated in the hills by alerce trees (*Fitzroya cupressoides*). The plant that most captured our fancy, however, was a handsome small tree that had red pendent flowers and white pulpy fruit with black seeds: *Crinodendron hookerianum*, of the Elaeocarpaceae. This species has been grown in the Northwest with success when given protection in the winter.

**Conguillio**. After our fieldwork south of Valdivia, we traveled northwards to localities where the temperatures were generally higher and from which we would not necessarily expect plants to be hardy in the Pacific Northwest. Imagine our amazement at seeing, at 1,000 m elevation in Parque Nacional Conguillio-Los Paraguas (38° 40' S), a forest of *Araucaria araucana* and *Nothofagus* (see photo). This is one of only two parks in Chile where this *Araucaria* grows naturally; it is hard to imagine the monkey-puzzle as a threatened species, preserved only through the farsightedness of the

*Forest of* Araucaria araucana *and* Nothofagus *at Parque Nacional Conguillio-Los Paraguas. Photo by Sarah Hayden Reichard.*

Escallonia revoluta *at the botanic garden of the Universidad Austral de Chile, Valdiva (left).* E. virgata *at Parque Nacional Puyehue (right). Photos by Clement Hamilton.*

Chileans. Another highlight was a second species of *Azara*: *A. integrifolia*, a 5 m tree with smoky violet-white fruit. Much of the landscape was barren lava that had sparse occasional islands and ridges of forest.

The other *Araucaria* park, Parque Nacional Nahuelbuta, is in the coast range west of the central valley. We were guided there by Sr. Leonel Pincheira, a ranger and self-educated naturalist who for 20 years has tenaciously avoided becoming desk bound.

**Laguna del Laja**. Farther north yet, Parque Nacional Laguna del Laja (37° 30' S) provided an exciting last field site. Coming into the park from the west, we encountered, in a dry landscape, shrubs of *Fabiana imbricata* (Solanaceae), a cultivar of which is being introduced by the University of British Columbia Botanical Garden. Its vegetative texture is heather-like, while its flowers are narrow white tubes in dense clusters. The most startling vegetation follows the streams at 1,000 m elevation, where *Escallonia revoluta* (see photo) grows among the giant herb *Gunnera tinctoria* (syn. *G. chilensis*), with leaves to 1.5 m long. The other common *Gunnera*, *G. magellanica*, has minute leaves (to 7 cm long) and grows at higher elevations and in Patagonia; both species also occur at Puyehue. A hot climb to 1,500 m rewarded us with *Austrocedrus chilensis*, a shrubby conifer in the Cupressaceae, and *Orites myrtoidea*, a handsome shrub in the Proteaceae.

**Monumento Nacional Fuerte Bulnes**. About halfway through the work in the Lakes Region, Sarah had the opportunity to fly to the area surrounding the Straits of Magellan for additional field study. One place she found botanically interesting was the national park around Fuerte Bulnes, about 50 km south of Punta Arenas, the southernmost city in the world. Meadows that are maintained by the constant buffeting winds feature dwarfed shrubs of *Drimys winteri* subsp. *winteri*, *Ribes magellanica*, *Embothrium coccineum*, *Empetrum rubrum*, and *Pernettya mucronata*. In small sheltered valleys these same plants grow to their full size; *Drimys winteri* subsp. *winteri*, the dominant tree, grows to 15 m and *Ribes magellanicum* becomes a large understory shrub.

Our fieldwork, plus intensive scrutiny of herbarium specimens, has enabled us to solve many taxonomic puzzles in *Escallonia* and *Drimys*. It is also exciting to observe that several of our many batches of seed, such as *Orites* and *Embothrium*, are beginning to germinate here. We eagerly anticipate reporting future successes in incorporating some of our treasures into the Center for Urban Horticulture and Arboretum plant collections, and into landscapes throughout Puget Sound.

## More Reading

See "Plants of the Winter-Rain Regions I: General Vegetation," *Washington Park Arboretum Bulletin*, Fall 1986.

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Dr. Hamilton teaches horticultural plant taxonomy, landscape plant selection, and evolutionary biology at the Center for Urban Horticulture (CUH), University of Washington.

Ms. Reichard is a graduate student at CUH, pursuing the systematics and landscape introduction of *Drimys*.

# In the Arboretum

Christina Pfeiffer

Corylopsis pauciflora, *acquired by the Arboretum in 1941. Photo courtesy of the Center for Urban Horticulture.*

## Azalea Way Is Being Renovated

Arboretum users will remember that very poor drainage and soggy soil conditions once left Azalea Way inaccessible during wet seasons and very muddy in some sections all year long. To accommodate the high pedestrian use of this area, an extensive system has been designed for better drainage. Changes employ successful methods used to minimize the impact of foot traffic on golf courses and athletic fields. The improvement includes a gravel-encased drainage system that runs the full length of Azalea Way and into a section of the Flats. The pathway has been graded to complement the new drainage system, surfaced with a 6-inch layer of special-grade sand, and reseeded with a blend of perennial rye grass. This difficult project has been accomplished with great care, and minimal impact to the surrounding trees and plantings, by the Arboretum staff, SunUp Construction, C.H. Kuhn & Associates (civil engineers), and the Seattle Parks Department.

Installation of the new sub-surface drainage system on Azalea Way was completed in the fall of 1988. New turf was seeded and surrounded by a construction fence that also encloses a portion of the Flats—southwest of Azalea Way before the Lookout. Pedestrians will be glad to know that there are three crossing areas, including the Lynn Street path, Loderi Valley path, and the south end of the Flats. The fences will be removed in late spring 1989 after the grass has established well enough to tolerate foot traffic.

The Azalea Way renovation is part of the Seattle 1-2-3 Bond Issue. The contract was administered by the Seattle Department of Parks and Recreation with participation from the University of Washington Arboretum staff.

The temporary inconvenience of fencing off Azalea Way will be offset by improved access to this favored trek. To ensure the long-term benefit of the improvements, jogging will not be allowed there because of the destructive impact.

## Visit the New Joseph A. Witt Winter Garden

Progress continues in the Winter Garden, with major completion scheduled for December. The central area of the garden was graded to improve surface drainage in 1987, followed by installation of drainage tile and the large path. Last summer, our staff installed additional drainage and a series of small foot trails which weave through the planting areas. Over 300 cubic yards of soil have been used to build berms and create new planting beds.

Several large plants have been moved from other Arboretum collections to the Winter Garden. Included are six *Hamamelis* (witch hazel), six *Azara microphylla*, one *Chimonanthus*, one *Rhododendron strigillosum*, three *Corylopsis*, three *Lonicera*, and one *Mahonia* 'Arthur Menzies.'

## Look for New Display Labels

The first set of 4×6-inch display labels have been installed on several large trees along Arboretum Drive and Azalea Way. These green-and-white engraved labels were made on our new labeling machine and installed by a volunteer. The labels contain the botanical name of each plant along with its common name and origin. The accession number and year also are given (e.g., accession #258-44 is the 258*th* plant received in 1944). The new labels are more prominent than the metal labels, as you will notice when you visit the Arboretum.

## Arboretum Surveyed

Work to map the Arboretum on a grid system began in the summer of 1988. The grounds were surveyed and monuments were installed on 100-foot centers. These grids will be the foundation for mapping the vegetation and collected plants, and, in turn, the information can be stored on a computer. The grid-system maps will be an invaluable tool for visitors on a plant search, as well as for Arboretum inventory, planning, and maintenance. This first stage was funded by a grant from the Institute of Museum Services.

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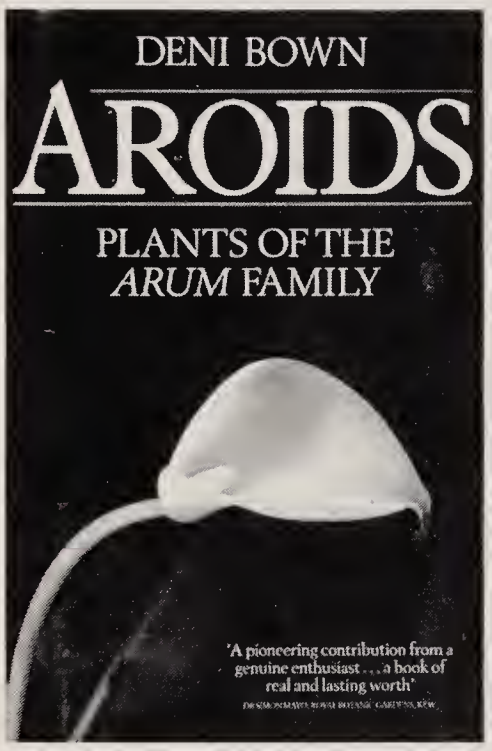
Christina Pfeiffer is the horticulturist for the Arboretum.

# Book Reviews

***Aroids: Plants of the Arum Family***. Deni Brown (with photographs by the author). Timber Press, Portland, Oregon: 1988. 256 pages.

This splendid book fills an aching void. Somewhat comparable in its general approach and philosophy is Cecil Prime's delightful little volume, *Lords and Ladies* (Collins: London, 1980), but Prime's book is largely restricted to *Arum maculatum*.




To the best of my knowledge, nobody has ever before been able to bring up the courage, enthusiasm, energy, stick-to-it-iveness and know-how to cover the whole arum lily family—beyond a doubt the most fascinating group of flowering plants on our planet. Brown has done an admirably thorough job of covering the many aspects of arum lily life, illuminating their role in horticulture and agriculture, history, art, folklore, nutritional studies, medical science, pollination biology and evolution, biochemistry, etc. In addition, she has provided a number of excellent color photographs which further enhance the value of this book.

The author points out that this family contains an array of the most diverse adaptations to environmental conditions: Certain representatives will thrive in deserts, some in aquatic environments, and others live as epiphytes in tropical jungles. Individual plants of jack-in-the-pulpit (*Arisaema triphyllum*) can change their sex, being male in one year and female in another, depending upon environmental conditions.

My view of arum lilies as "perfectionist extremists" can be supported with special persuasiveness in the area of pollination biology; inflorescences of many species represent perfect traps, with timing mechanisms of well-nigh incredible perfection that make cross-pollination a practical certainty. Some species have developed fungus-mimicry and are pollinated by female fungus-gnats which normally deposit their eggs in mushrooms.

The inflorescences of *Sauromatum* (the voodoo lily), *Arum*, *Philodendron*, *Amorphophallus*, *Monstera*, and others display thermogenicity. They develop considerable heat in a respiratory flare-up (a veritable metabolic explosion), so fierce that, when it peaks, the metabolism compares favorably with that of a hovering hummingbird. The biological function of the heat is to volatilize the strong odors which serve as the pollinator-attractants here. In the voodoo lily, the respiratory explosion is triggered by salicylic acid (closely related to aspirin which is about half as effective).

In a few places it is obvious that Ms. Brown is not a scientist (as she herself points out). Her book is not free from sensationalism, and there are some regrettable oversimplifications and inaccuracies. Also, the number of misspellings is too high for a book of this caliber, but I trust that these shortcomings can be easily overcome in the later editions of this book—and we hope that there will be many of those.—Reviewed by B.J.D. Meeuse

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Dr. Bastiaan Meeuse is a professor emeritus of botany at the University of Washington. He is the author of *The Story of Pollination* (1961), and *The Sex Life of Flowers* (1984; co-authored by Sean Morris).

***The Traveler's Guide to American Gardens***. Edited by Mary Helen Ray and Robert P. Nichols. University of North Carolina Press, Chapel Hill: 1988. 375 pages.

If you have ever returned home from a distant city, only to learn that you were within miles of a good public garden and did not even know it, then the recently released *The Traveler's Guide to American Gardens* is well worth consideration.

State by state, this book surveys the best of American public gardens, over one thousand in all. It offers practical information such as addresses and

*Biltmore Estate and Gardens, Asheville, North Carolina.*
*Illustration from* The Traveler's Guide to American Gardens.

telephone numbers, as well as brief descriptions of significant features. Each state is introduced with a short preface on its history, geography, and climate. Readers are supplied with simple state maps locating the gardens that follow.

The editors employ the heading ''Garden'' in a broad sense, taken to include not only arboreta, conservatories, and display gardens, but also natural preserves and historic landscapes. Gardens of historic importance are especially well represented, which is not surprising since one of the editors, Mary Helen Ray, has been the Historic Preservation Chair for the National Council of State Garden Clubs. Even though the editors have sought to include only the best gardens, a two-star rating system is used, differentiating between gardens in the ''must see'' category and gardens merely of superior quality.

*The Traveler's Guide* is a revision of the 1982 *Guide to Significant and Historic Gardens of America*. This new edition has been considerably enlarged. While recognizing that the book was not intended to be all inclusive, there are still some important gardens omitted. Overall, the editors have done their best job listing gardens on the eastern seaboard—particularly in the Southeast; both editors are from Georgia.

The eight-year-old Dallas Arboretum and Botanical Society (DABS) is not mentioned, nor is the Carl S. English, Jr., Gardens at the Government Locks in Seattle, which surely is one of the finest horticultural endeavors in the region. Moreover, many of the inaccuracies of the first book are repeated. For instance, the entry for the the Washington Park Arboretum contains several errors: the Arboretum is 200 acres (not as they reported); the Seattle Garden Club originally supported the development of Azalea Way, not the group designated; the Arboretum is open 8:00 a.m. to sunset every day of the year, unlike the limited times and months they reported. Although many are minor points, the sum total of these inaccuracies leads one to wonder whether the editors have done their homework, especially in revising their original material.

Inaccuracies notwithstanding, *The Traveler's Guide to American Gardens* provides the garden pilgrim with the right leads and is a good, inexpensive guide to American horticulture. If you tend to fit your travel plans around the gardens you can visit, this guide is for you.—Reviewed by Scot Medbury

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Scot Medbury is a graduate student at the Center for Urban Horticulture and coordinator of public classes for CUH. His column on public garden destinations of interest to Arboretum members starts in the next issue.

# New on the Shelves of the Elisabeth C. Miller Library

VALERIE EASTON

***Suzhou: A Garden City***. Foreign Languages Press. Beijing: 1984.

A new addition to the Library's growing collection on Chinese gardens, this beautifully photographed book makes us eager for the planned creation of Seattle's own Chinese garden. The ancient garden city of Suzhou boasts gardens built over a period of a thousand years; these gardens artfully create the impression of natural scenery on a smaller scale. Scholars and rich merchants settled in Suzhou over the centuries because of its favorable location in southeastern China, and built these private architectural gardens, with such evocative names as the Humble Administrator's Garden, the Lion Grove, and the Lingering Garden. This volume illustrates Chinese culture over the centuries and is an excellent guide to the wonders of Chinese garden design.

***The Low Maintenance Garden***. Graham Rose. Penguin Books: 1987.

This guide is another in the series of useful handbooks published in cooperation with the New York Botanical Garden Institute of Urban Horticulture. It contains creative ideas for low-maintenance gardens that go beyond the use of ground covers and hard surfaces. The book has a clear text that emphasizes gardening techniques such as soil improvement and drip irrigation; labor-saving designs from small patio gardens to large, semi-wild gardens; and a good, if brief, list of minimum-care plants, along with recommended varieties from herbs to trees. Excellent photographs.

## More Reading

There is a growing collection of books about plants and gardening for children and adults that work with children. The book collection was started to support the Arboretum Saplings Program. It is used frequently by children working on school projects or for enjoyment by kids who accompany their parents to the Library. Teachers, school librarians, and Saplings volunteers, among others, take advantage of the collection.

Listed below are several highlights from the "Children and Nature" list of over forty titles available in the Miller Library. Copies of the complete book list are available at the Library counter.

***Your First Garden Book***. Marc Tolon Brown. Little, Brown, Boston: 1981. Suggested projects outline for beginning gardeners how to sprout seeds, turn soil, plant, and care for the results.

***Mysteries and Marvels of Plant Life***. Barbara Cork. Usborne, London: 1983. A fascinating introduction to the unusual, extraordinary, and unexplained in the plant world.

***Sharing Nature with Children: A Parents' and Teachers' Nature-Awareness Guidebook***. Joseph Bharat Cornell. Ananda Publications, Nevada City, California: 1979. Activities such as micro-hikes and camouflage help kids to "feel" nature as they learn about it in an enthusiastic, yet sensitive, approach to nature.

***Plants That Never Ever Bloom***. Ruth Heller. Grosset and Dunlap, New York: 1984. Brief rhyming text and illustrations present a variety of plants that do not flower but propagate by means of spores, seeds, and cones.

***Plants Do Amazing Things.*** Hedda Nussbaum. Random House, New York: 1977. Describes a variety of plants with unusual characteristics, including those that give off light and those that eat insects.

***Looking at Plants***. David T. Suzuki. Warner Books, New York: 1987. Written by the host of the PBS TV show, "The Nature of Things," this idea book teaches an appreciation of living, growing things, and includes simple "Rules for Nature Lovers."

***Gardens for Children***. Tigger Wise. Kangaroo Press, Kenthurst: 1987. A fun and imaginative guide to planning a garden in which a child can play, learn, and explore.

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Valerie Easton is a librarian at the Center for Urban Horticulture and the book review editor of the *Washington Park Arboretum Bulletin.*

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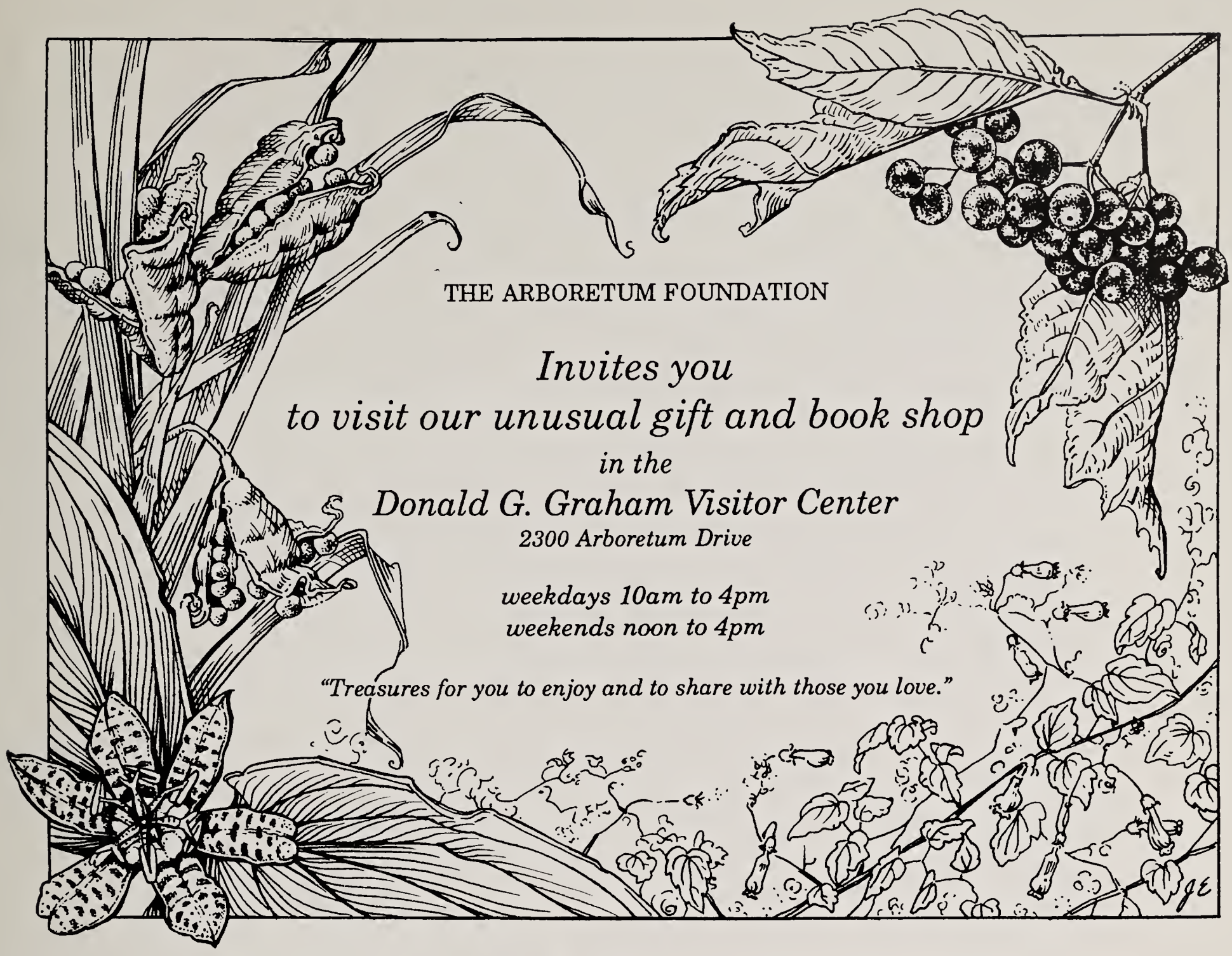

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